What is Claimed is:

1. A muscle stimulator adapted to apply a magnetic field to at least one muscle group associated with an upper airway of a patient having a breathing disorder to induce tension in said muscle group to treat said breathing disorder, said muscle stimulator comprising:

a plurality of loops of electrical wire;

a power supply that selectively provides electrical power to said plurality of loops to produce said magnetic field;

a sensor adapted to monitor a physiological characteristic of a patient;

a control unit that receives signals output by said sensor and controls application of said electrical power from said power supply to said plurality of loops of electrical wire based thereon; and

a positioning appliance adapted to secure said plurality of loops of electrical wire to a patient at a position relative to said at least one muscle group such that said magnetic field produced by applying said electrical power to said plurality of loops of electrical wire induces tension in said at least one muscle group to treat said breathing disorder.

2. The muscle stimulator of claim 1, further comprising a temperature sensor disposed proximate to said plurality of loops of electrical wire to sense a temperature of said loops.

3. The muscle stimulator of claim 2, wherein said control unit prevents application of electrical power to said plurality of loops of electrical wire responsive to said temperature detected by said temperature sensor exceeding a predetermined threshold temperature.

4. The muscle stimulator of claim 1, wherein said sensor is an audio sensor disposed on said positioning appliance and adapted to detect snoring sounds produced by said patient and to output a signal indicative thereof.

5. The muscle stimulator of claim 1, wherein said sensor detects a condition of a patient associated with respiration outputs a signal indicative thereof.

6. The muscle stimulator of claim 1, wherein said plurality of loops of electrical wire are non-overlapping and are carried by said positioning appliance such that a peripheral portion of each loop is adjacent a peripheral portion of another loop.

7. The muscle stimulator of claim 6, wherein each loop in said plurality of loops has more than one turn.

8. The muscle stimulator of claim 7, wherein each loop generally a same number of turns and all loops are energized from a common pair of terminals.

9. The muscle stimulator of claim 8, wherein said turns in each loop are arranged in a spiral, such that turns distal from a common central axis in each loop have a radius that is greater than turns proximate to said common central axis in that same loop.

10. The muscle stimulator of claims 6, wherein an outer peripheral portion of at least one of said loops, which is not adjacent a peripheral portion of another of said loops, is carried by said positioning appliance so as to be spaced further apart from said patient than another portion of said at least one loop that is adjacent another one of said loops responsive to said positioning appliance attaching said plurality of loops to said patient, thereby minimizing an amount of heat produced by said loops that reaches said patient.

11. The muscle stimulator of claim 6, wherein said plurality of loops of electrical wire comprises four loops having a common terminal and configured such that applying electrical power to said common terminal produces four areas where said magnetic fields are concentrated.

12. The muscle stimulator of claim 6, wherein said plurality of loops of electrical wire comprises three loops configured such that applying electrical power to said three loops produces two areas where said magnetic fields are concentrated.

13. The muscle stimulator of claim 6, wherein said plurality of loops of electrical includes a first loop and a second loop, said first loop being independent of said second loop so that that said first loop is capable of being energized independently of said second loop.

14. The muscle stimulator of claim 1, further comprising a thermal insulating material disposed between said plurality of loops from said patient.

15. The muscle stimulator of claim 1, wherein said positioning appliance is a selectively attachable collar adapted to encircle a neck of said patient and to be worn by said patient such that said plurality of loops are positioned proximate to said neck between a chin and a sternum.

16. The muscle stimulator of claim 15, wherein said collar includes markings on an exposed surface thereof to assist in properly positioning said collar on said patient.

17. The muscle stimulator of claim 1, wherein said control unit is operatively coupled to said positioning appliance and said sensor via a flexible cable for hardwire transmission of signals between said control unit and said sensor and said coil carried by said positioning appliance.

18. The muscle stimulator of claim 1, wherein said sensor is carried by said positioning appliance such that properly positioning said positioning appliance on said patient locates said loops in a position relative to said muscles to be stimulated and also locates said sensor at an appropriate position on said patient for collecting relevant data.

19. The muscle stimulator of claim 1, wherein said control unit includes means for comparing said signal output by said sensor to a threshold value indicative of an occurrence of an apneic event, said control unit causing said power supply to supply electrical power to said plurality of loops of electrical wire responsive to said signal exceeding said threshold value.

20. The muscle stimulator of claim 19, wherein said control unit further includes means for monitoring a number of times said signal exceeds said threshold values during a predetermined time interval, said control unit causing said power supply to provide said electrical energy to said plurality of loops responsive to said number of times said signal exceeds said threshold values during said predetermined time interval being greater than a first predetermined number.

21. The muscle stimulator of claim 20, wherein said control unit includes means for adjusting said threshold values.

22. The muscle stimulator of claim 1, wherein said control unit includes means for adjusting an intensity of said magnetic field produced by said muscle stimulator and a duration that said magnetic field is applied to said patient.

23. The muscle stimulator of claim 22, wherein said means for adjusting said intensity of said magnetic field adjusts said magnitude responsive to signals provided by said sensor.

24. The muscle stimulator of claim 1, wherein said plurality of loops of electrical wire are defined by a continuous electrical wire.

25. The muscle stimulator of claim 1, further comprising a warning system that provides a warning signal indicative of one of a condition of said patient and a condition of said muscle stimulator.

26. The muscle stimulator of claim 1, further comprising an implantable non-conductive member adapted to provide an electric field discontinuity to enhance excitability of a nerve proximate to said non-conductive member responsive to application of said magnetic field.

27. The muscle stimulator of claim 1, further comprising a miniature intramuscular stimulator adapted to be implanted in said patient, said miniature intramuscular stimulator transferring energy contained in said magnetic field produced by said into electrical energy that is adapted to be applied directly to said patient at a site of said intramuscular stimulator.

28. The muscle stimulator of claim 27, wherein said intramuscular stimulator includes a receiving coil adapted to receive signals from said coil, a decoding network that enables said control unit to distinguish and control said intramuscular stimulator independently of other intramuscular stimulators, and an electrode for applying electrical energy to a portion of said patient contacting said electrode, said electrical energy being derived from said magnetic field applied to said intramuscular stimulator.

29. The muscle stimulator of claim 27, further comprising a first intramuscular stimulator and a second intramuscular stimulator, wherein said control unit is capable of actuating said first intramuscular stimulator independent of said second intramuscular stimulator.

30. A muscle stimulator adapted to apply a magnetic field to at least one muscle group associated with an upper airway of a patient having a breathing

disorder to induce tension in said muscle group to treat said breathing disorder, said muscle stimulator comprising:

a plurality of loops of electrical wire;

means for supplying electrical power to said plurality of loops of electrical wire to produce said magnetic field;

means for monitoring a physiological characteristic of a patient;

means, receiving signals output by said first sensing means, for controlling said electrical power provided to said plurality of loops based thereon; and

means for maintaining said plurality of loops of electrical wire at a position relative to a patient so as to direct said magnetic field produced by said plurality of loops at said at least one muscle group to induce tension in said at least one muscle group to treat said breathing disorder.

31. A method of applying a magnetic field to at least one muscle group associated with an upper airway of a patient having a breathing disorder induce tension in said muscle group to treat said breathing disorder, said muscle stimulator comprising:

affixing a plurality of loops of electrical wire proximate to said at least one muscle group;

monitoring a physiological characteristic of a patient;

providing electrical power to said plurality of loops of electrical wire to produce said magnetic field based on said monitored physiological characteristic,

thereby inducing tension in said at least one muscle group to treat said breathing disorder.

32. The method of applying a magnetic field according to claim 31, further comprising the steps:

generating a signal indicative of said physiological characteristic;

comparing said signal to a threshold value indicative of an occurrence of breathing disorder; and

applying electrical power to said plurality of loops of electrical wire responsive to said signal exceeding said threshold value.

33. The method of applying a magnetic field according to claim 32, further comprising the step of monitoring a number of times said signal exceeds said threshold value during a predetermined time interval, and applying said electrical energy to said plurality of loops responsive to said number of times said signal exceeds said threshold values during said predetermined time interval being greater than a first predetermined number.

34. The method of applying a magnetic field according to claim 33, further comprising the step of adjusting said threshold values.

35. The method of applying a magnetic field according to claim 31, further comprising the step of adjusting an intensity of said magnetic field and a duration that said magnetic field is applied to a patient.

36. The method of applying a magnetic field according to claim 31, further comprising providing a non-conductive member proximate to a nerve in a patient, said non-conductive member providing an electric field discontinuity to enhance excitability of said nerve responsive to application of said magnetic field.

37. A system for diagnosing the likelihood that a subject suffers from obstructive sleep apnea, comprising:

a compliance measuring system adapted to measure a compliance level of said subject;

a magnetic stimulator adapted to magnetically stimulate at least one muscle group associated with an upper airway of said subject;

means for causing said compliance measuring system to measure a first compliance level of said subject in an absence of magnetic stimulation and to measure a second compliance level of said subject while said magnetic stimulation is being applied to said least one muscle group associated with said upper airway; and

means for comparing said first compliance level to said second compliance level to determine a difference therebetween, whereby the smaller said

difference between said first and said second compliance level, the more likely said subject is likely to suffer from obstructive sleep apnea.

38. A method of diagnosing the likelihood that a subject suffers from obstructive sleep apnea, comprising the steps of:

measuring a compliance of said subject to obtain a first compliance level;

applying a magnetic field to at least one muscle group associated with an upper airway of said subject;

measuring said compliance of said subject while applying said magnetic field to at least one muscle group associated with an upper airway to obtain a second compliance level; and

comparing said first compliance level to said second compliance level to determine a difference therebetween, whereby the smaller the difference between said first and said second compliance level, the more likely said subject is likely to suffer from obstructive sleep apnea.